Doc. Number :

■ Tentative Specification
☐ Preliminary Specification
☐ Approval Specification

MODEL NO.: M280DGJ
SUFFIX: L30

Customer:

APPROVED BY **SIGNATURE**

Name / Title _____ _____

Note
Product Version A1/A2

Please return 1 copy for your confirmation with your signature and comments.

Approved By	Checked By	Prepared By
吳柏勳	梁永祥	黃世中

CONTENTS

REVISION HISTORY

Version	Date	Page	Description
0.0	4.22, 2013	All	Tentative Spec Ver.0.0 was first issued.
0.1	4.25, 2013	5	Pixel Pitch: 0.32 (H) x 0.32 (V) -> 0.16 (H) x 0.16 (V)
0.2	6.25, 2013	4.3.1	Comment Power Supply Current value

1. GENERAL DESCRIPTION

1.1 OVERVIEW

M280DGJ-L30 is a 28.0" TFT Liquid Crystal Display module with WLED Backlight unit and 51 pins 8 lane –V by 1 interface. This module supports 3840 x 2160 UHD mode and can display up to 1.073G colors. The converter module for Backlight is not built in.

1.2 GENERAL SPECIFICATIONS

Item	Specification	Unit	Note
Screen Size	648.9 (H) X 369.3 (V)	mm	
Driver Element	a-si TFT active matrix	-	-
Pixel Number	3840 x R.G.B. x 2160	pixel	-
Pixel Pitch	0.16 (H) x 0.16 (V)	mm	-
Pixel Arrangement	RGB vertical stripe	-	-
Display Colors	1.073G	color	-
TCO	(TCO 6.0 compliance)		
Transmissive Mode	Normally White	-	-
Surface Treatment	AG type, 3H hard coating, Haze 25	-	-
Luminance, White	300	Cd/m2	
Power Consumption	Total (29.32) W(Typ.) @ cell (7) W(Typ.), BL (22.32)W(Typ.)		(1)

Note (1) The specified power consumption : Total= cell (reference 4.3.1)+BL (reference 4.3.3)

2. MECHANICAL SPECIFICATIONS

Item		Min.	Typ.	Max.	Unit	Note
Module Size	Horizontal (H)	648.4	648.9	649.4	mm	(1)
	Vertical (V)	368.8	369.3	369.8	mm	
	Thickness (T)	19.35	19.85	20.35	mm	
Bezel Area	Horizontal	626.43	626.93	627.43	mm	
	Vertical	346.78	347.28	347.78	mm	
Active Area	Horizontal	-	620.93	-	mm	
	Vertical	-	341.28	-	mm	
Weight		-	(2910)	(3010)	g	

Note (1) Please refer to the attached drawings for more information of front and back outline dimensions.

3. ABSOLUTE MAXIMUM RATINGS

3.1 ABSOLUTE RATINGS OF ENVIRONMENT

Item	Symbol	Value		Unit	Note
		Min.	Max.		
Storage Temperature	TST	-20	60	ºC	(1)
Operating Ambient Temperature	TOP	0	50	ºC	(1), (2)

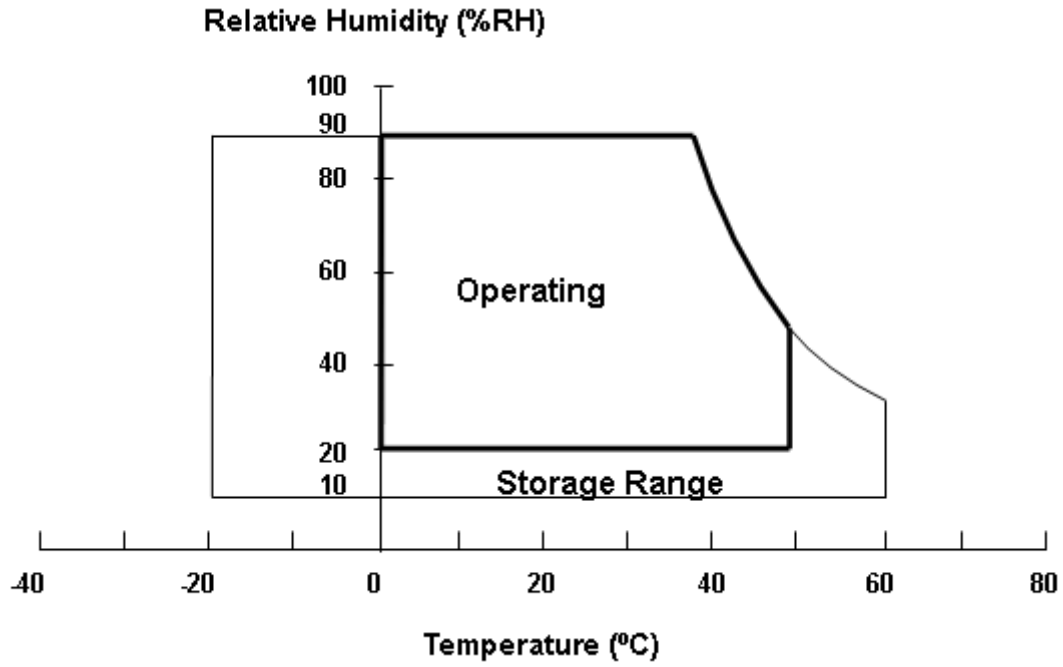
Note (1)

(a) 90 %RH Max. (Ta <= 40 ºC).

(b) Wet-bulb temperature should be 39 ºC Max. (Ta > 40 ºC).

(c) No condensation.

Note (2) The temperature of panel surface should be 0 ºC min. and 60 ºC max.



3.2 ELECTRICAL ABSOLUTE RATINGS

3.2.1 TFT LCD MODULE

Item	Symbol	Value		Unit	Note
		Min.	Max.		
Power Supply Voltage	VCCS	-0.3	13.5.	V	(1)
Logic Input Voltage	VIN	-0.3	3.6	V	

3.2.2 BACKLIGHT UNIT

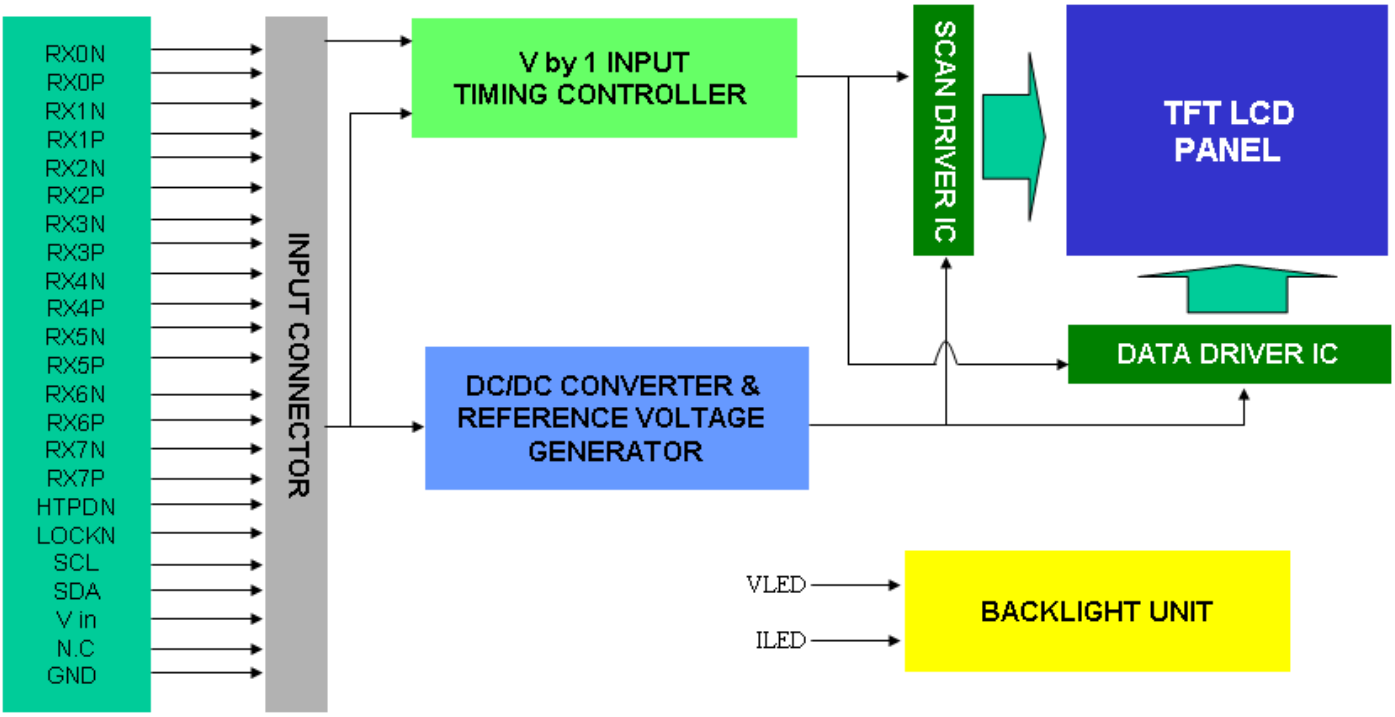
Item	Symbol	Value			Unit	Note
		Min.	Typ	Max.		
LED Forward Current Per Input Pin	IF	0	(150)	(160)	mA	(1), (2) Duty=100%

Note (1) Permanent damage to the device may occur if maximum values are exceeded. Function operation should be restricted to the conditions described under Normal Operating Conditions.

Note (2) Specified values are for input pin of LED light bar at Ta=25±2 ℃ (Refer to 4.3.3 and 4.3.4 for further information).

4. ELECTRICAL SPECIFICATIONS

4.1 FUNCTION BLOCK DIAGRAM



4.2. INTERFACE CONNECTIONS

PIN ASSIGNMENT

Pin	Name	Description
1	Vin	Power input (+12V)
2	Vin	Power input (+12V)
3	Vin	Power input (+12V)
4	Vin	Power input (+12V)
5	Vin	Power input (+12V)
6	Vin	Power input (+12V)
7	Vin	Power input (+12V)
8	Vin	Power input (+12V)
9	N.C.	No Connection
10	GND	Ground
11	GND	Ground
12	N.C.	No Connection
13	N.C.	INX internal use, please keep it in open and don't floating.
14	N.C.	No Connection
15	N.C.	INX internal use, please keep it in open and don't floating.
16	N.C.	INX internal use, please keep it in open and don't floating.
17	N.C.	INX internal use, please keep it in open and don't floating.
18	N.C.	No Connection
19	SCL	I2C Serial Clock
20	SDA	I2C Data
21	N.C.	INX internal use, please keep it in open and don't floating.
22	N.C.	INX internal use, please keep it in open and don't floating.
23	N.C.	No Connection

Pin	Name	Description
24	N.C	INX internal use, please keep it in open and don't floating.
25	HTPDN	Hot plug detect output, Open drain.
26	LOCKN	Lock detect output, Open drain.
27	GND	Ground
28	RX0N	First Pixel Negative V by One differential data input Lan 0.
29	RX0P	First Pixel Positive V by One differential data input Lan 0.
30	GND	Ground
31	RX1N	Second Pixel Negative V by One differential data input Lan 1.
32	RX1P	Second Pixel Positive V by One differential data input Lan 1.
33	GND	Ground
34	RX2N	Third Pixel Negative V by One differential data input Lan 2.
35	RX2P	Third Pixel Positive V by One differential data input Lan 2.
36	GND	Ground
37	RX3N	4th Pixel Negative V by One differential data input Lan 3.
38	RX3P	4th Pixel Positive V by One differential data input Lan 3.
39	GND	Ground
40	RX4N	5th Pixel Negative V by One differential data input Lan 4.
41	RX4P	5th Pixel Positive V by One differential data input Lan 4.
42	GND	Ground
43	RX5N	6th Pixel Negative V by One differential data input Lan 5.
44	RX5P	6th Pixel Positive V by One differential data input Lan 5.
45	GND	Ground
46	RX6N	7th Pixel Negative V by One differential data input Lan 6.
47	RX6P	7th Pixel Positive V by One differential data input Lan 6.
48	GND	Ground
49	RX7N	8th Pixel Negative V by One differential data input Lan 7.
50	RX7P	8th Pixel Positive V by One differential data input Lan 7.
51	GND	Ground

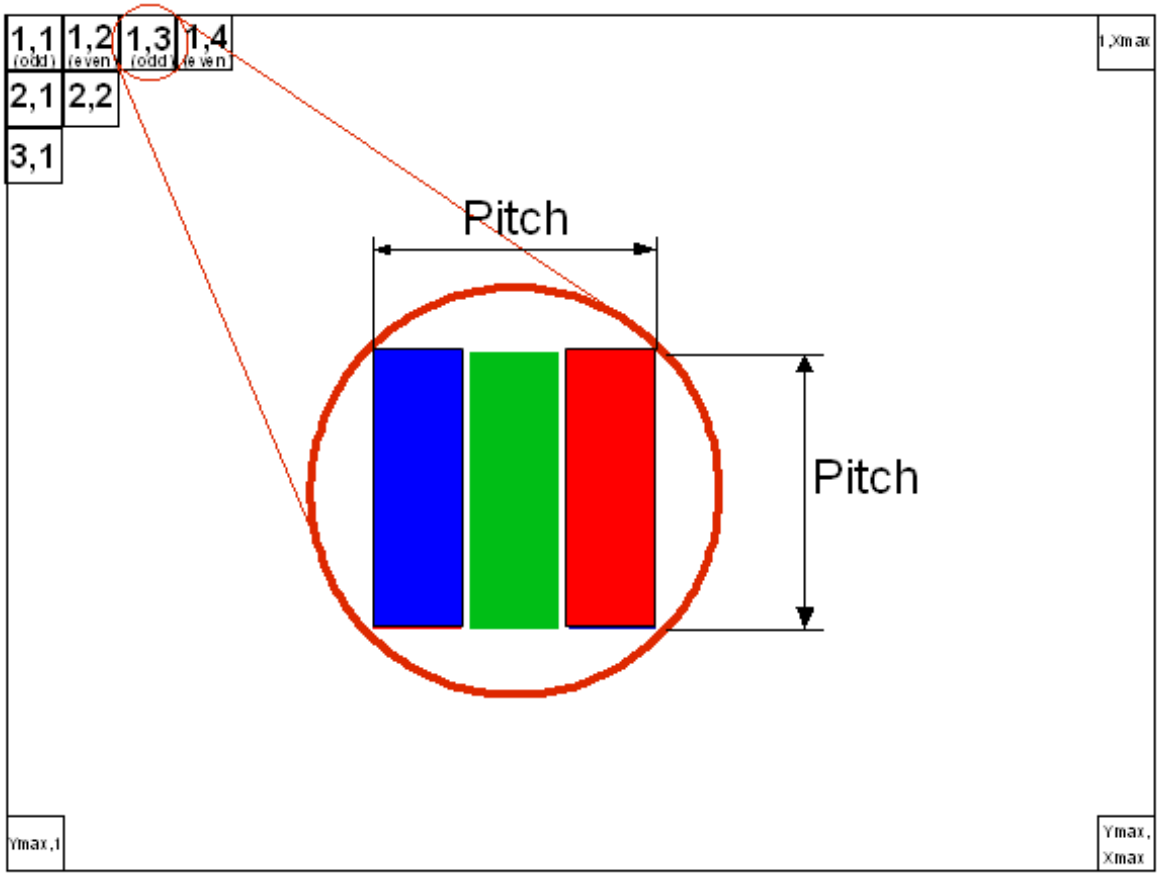
Connector Information

Item	Description
Manufacturer	FCN/ P-TWO
Type part number	FCN: WF23-402-5133 P-TWO: 187059-51221
User's Mating housing part number	JAE: FI-RE51HL

*Notice: There would be compatible issues if not using the indicated connectors in the matching list.

Note (1) The first pixel is odd.

Note (2) Input signal of even and odd clock should be the same timing.



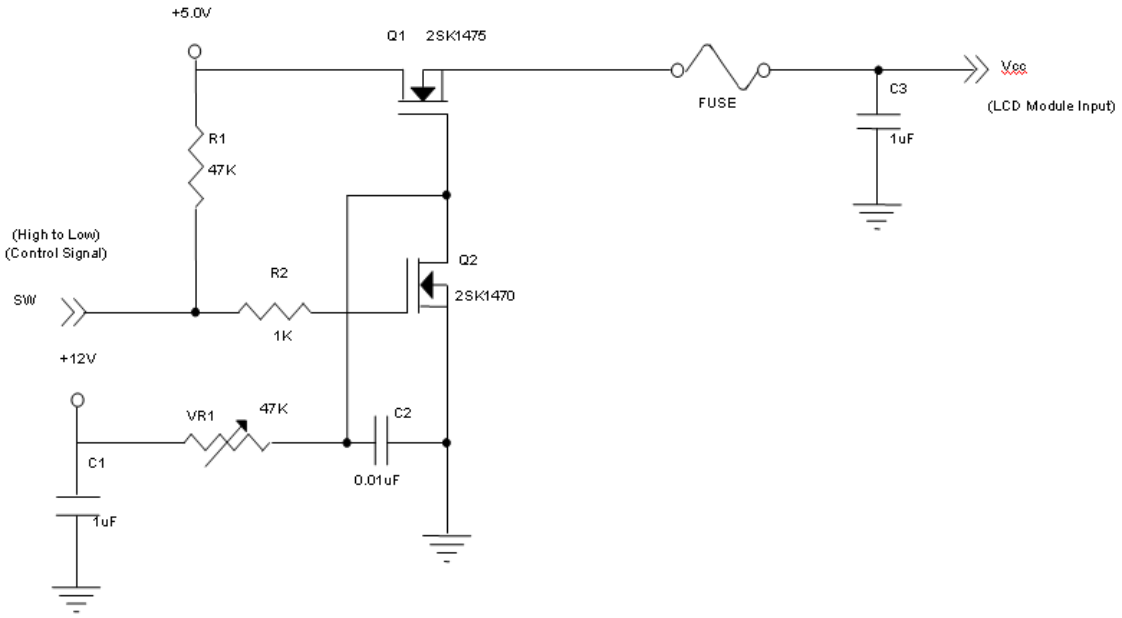
4.3 ELECTRICAL CHARACTERISTICS

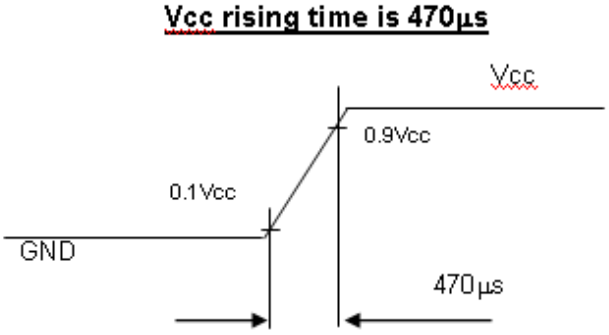
4.3.1 LCD ELETRONICS SPECIFICATION

Parameter		Symbol	Value			Unit	Note
			Min.	Typ.	Max.		
Power Supply Voltage		Vcc	10.8	12	13.2	V	-
Ripple Voltage		V_{RP}	-	-	TBD	mV	-
Rush Current		I_{RUSH}	-	TBD	TBD	A	(2)
Power Supply Current	White		-	535	635.7	A	(3)a
	Black		-	519.6	617	A	(3)b
	Horizontal Stripe		-	969.6	1163.5	A	(3)c
Power Consumption		PLCD	-	(7)	TBD	Watt	(4)
V-by-One interface	Differential Input High Threshold Voltage	V_{TH}	-	-	50	mV	
	Differential Input Low Threshold Voltage	V_{TL}	-50	-	-	mV	
	Terminating Resistor	RT	80	100	120	ohm	

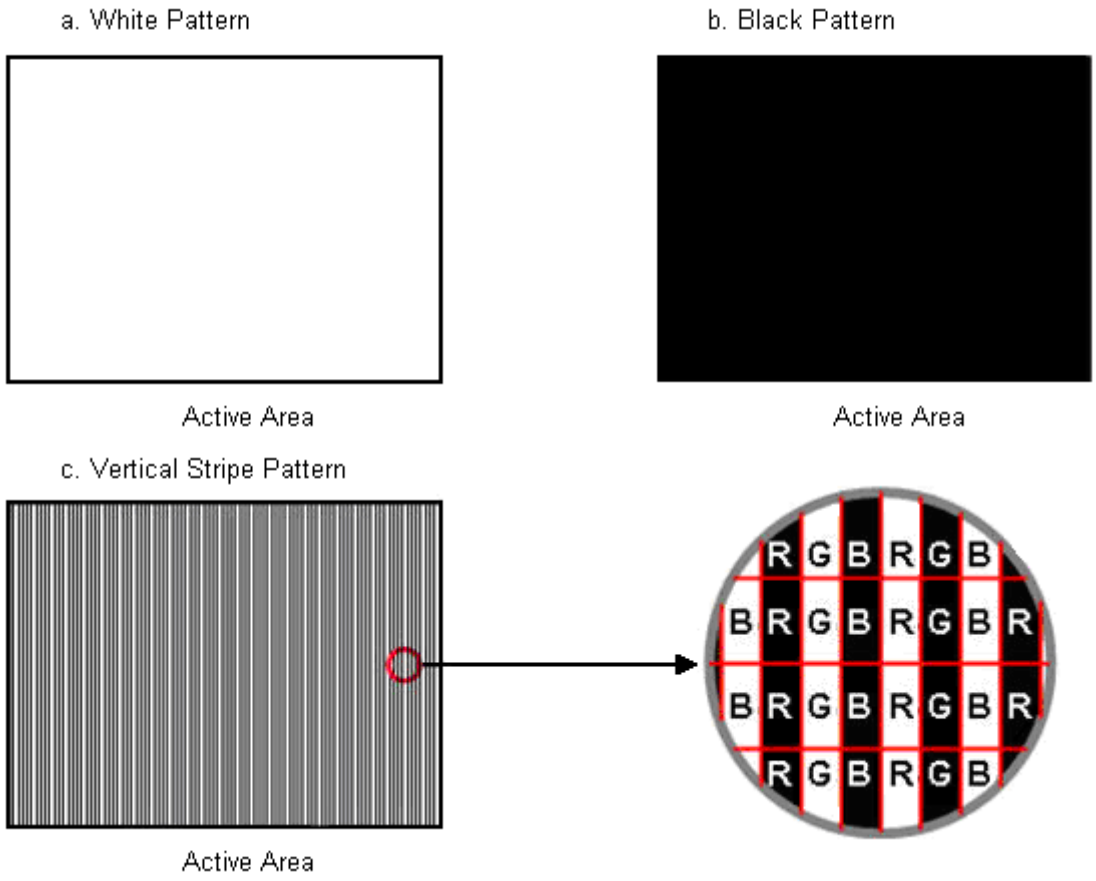
Note (1) The ambient temperature is Ta = 25 ± 2 ºC.

Note (2) Measurement Conditions:



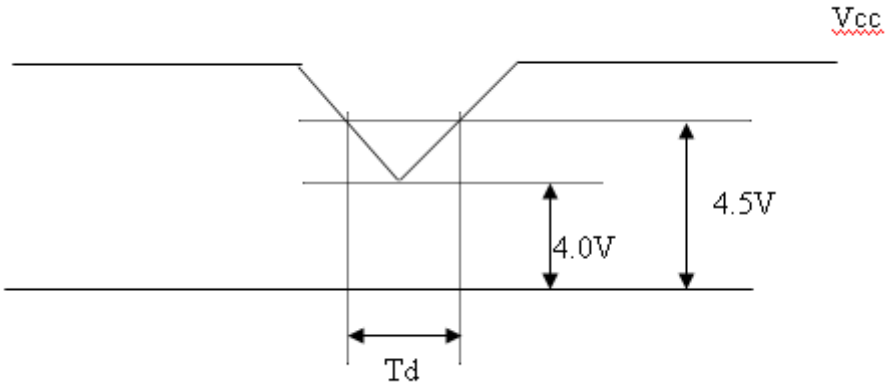


Note (3) The specified power supply current is under the conditions at Vcc = 12 V, Ta = 25 ± 2 ºC, Fr = 60Hz, whereas a power dissipation check pattern below is displayed.



Note (4) The power consumption is specified at the pattern with the maximum current.

4.3.2 Vcc Power Dip Condition



Dip condition: 4.0≦Vcc≦4.5, Td≦20ms

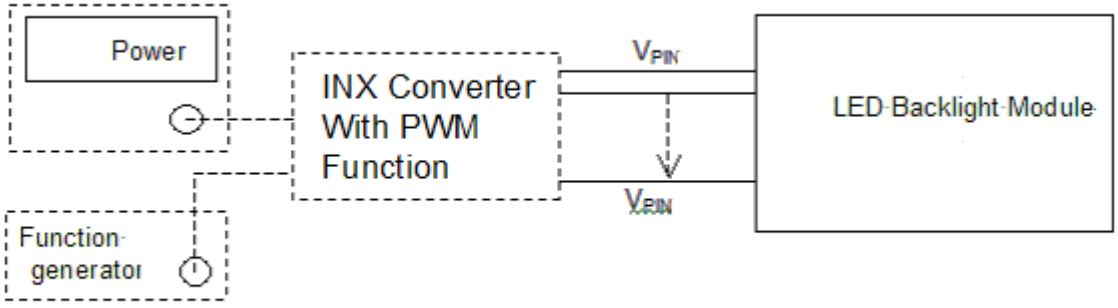
4.3.3 BACKLIGHT UNIT

Parameter	Symbol	Value			Unit	Note
		Min.	Typ.	Max.		
LED Light Bar Input Voltage Per Input Pin	VPIN	-	(37.2)	(39.6)	V	(1), Duty=100%, IPIN=100mA
LED Light Bar Current Per Input Pin	IPIN	-	(150)	(160)	mA	(1), (2) Duty=100%
LED Life Time	LLED	40000			Hrs	(3)
Power Consumption	PBL	-	(22.32)	(25.34)	W	(1) Duty=100%, IPIN=100mA

Note (1) LED light bar input voltage and current are measured by utilizing a true RMS multimeter as shown below:

Note (2) PBL = IPIN × VPIN × (4) input pins.

Note (3) The lifetime of LED is defined as the time when LED packages continue to operate under the conditions at Ta = 25 ±2 ℃ and I= (150)mA (per chip) until the brightness becomes ≦ 50% of its original value.



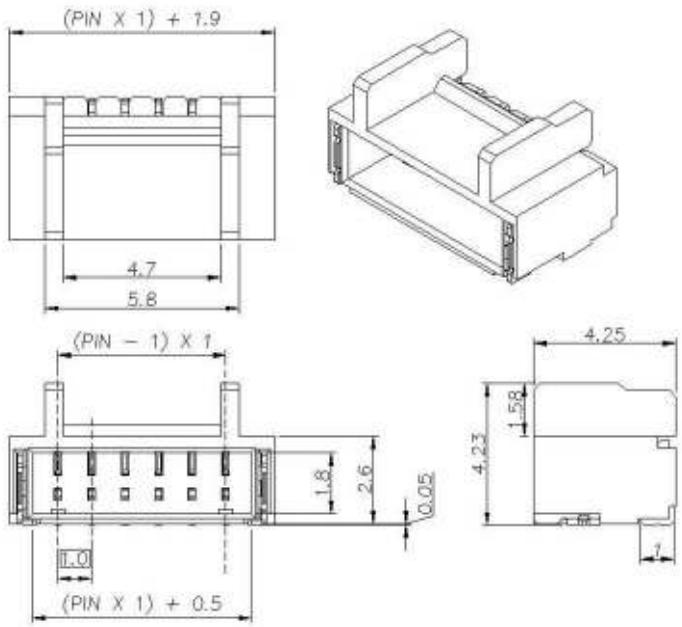
4.3.4 LIGHTBAR Connector Pin Assignment:

(1) Connector Information:

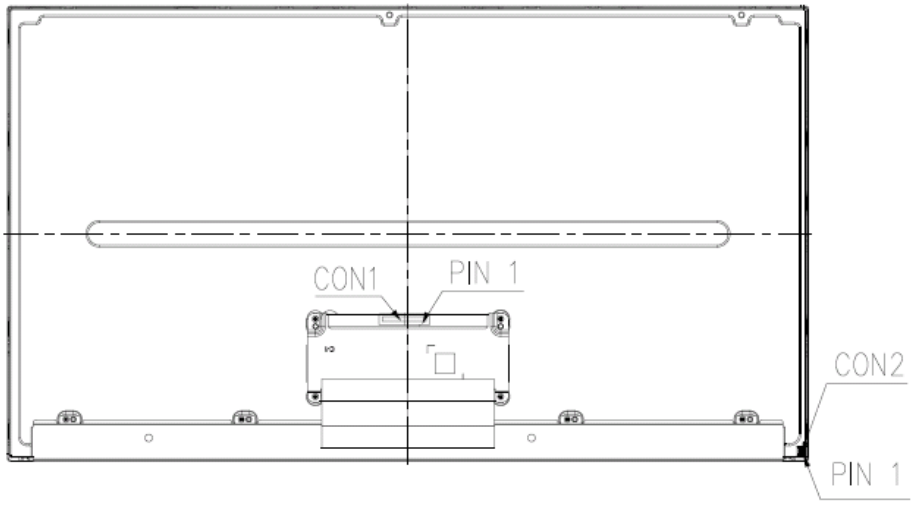
Item	Description
Manufacturer	FCN/ Entery/ CviLux
Type part number	WM13-406-063N(FCN) / 3707K-Q06N-08L(Entery) / CI1406M1HRK-NH(CviLux)
Mating housing part number	WF1300106-B (FCN) / H112K-P06N-01B (Entery) / M001-E11N-00R (Entery) / CI1406SL000-NH (CviLux).

*Notice: There would be compatible issues if not using the indicated connectors in the matching list.

(2) LB Connector drawing:



Pin number	Description
1	Cathode of LED string1
2	Cathode of LED string2
3	VLED
4	VLED
5	Cathode of LED string3
6	Cathode of LED string4



4.4 V by One INPUT SIGNAL SPECIFICATIONS

4.4.1 V by One DATA MAPPING TABLE

Lan	Data Stream
Lan 0	1, 9, 17, ..., 3825, 3833
Lan 1	2, 10, 18, ..., 3826, 3834
Lan 2	3, 11, 19, ..., 3827, 3835
Lan 3	4, 12, 20, ..., 3828, 3836
Lan 4	5, 13, 21, ..., 3829, 3837
Lan 5	6, 14, 22, ..., 3830, 3838
Lan 6	7, 15, 23, ..., 3831, 3839
Lan 7	8, 16, 24, ..., 3832, 3840

4.4.2 COLOR DATA INPUT ASSIGNMENT

The brightness of each primary color (red, green and blue) is based on the **10**-bit gray scale data input for the color. The higher the binary input, the brighter the color. The table below provides the assignment of color versus data input.

Color		Data Signal																													
		Red										Green										BLUE									
		R9	R8	G7	G6	R5	R4	R3	R2	R1	R0	G9	G8	G7	G6	G5	G4	G3	G2	G1	G0	B9	B8	B7	B6	B5	B4	B3	B2	B1	B0
Basic Colors	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Green	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0
	Blue	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1
	Cyan	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Magenta	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1
	Yellow	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0
	White	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Gray Scale Of Red	Red(0) / Dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(1)	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(2)	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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	Red(1021)	1	1	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(1022)	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(1023)	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gray Scale Of Green	Green(0) / Dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Green(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
	Green(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
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	Green(1021)	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0
	Green(1022)	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0
	Green(1023)	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0
Gray Scale Of Blue	Blue(0) / Dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Blue(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	Blue(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
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	Blue(1021)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	1	0
	Blue(1022)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	1
	Blue(1023)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1

Note (1) 0: Low Level Voltage, 1: High Level Voltage

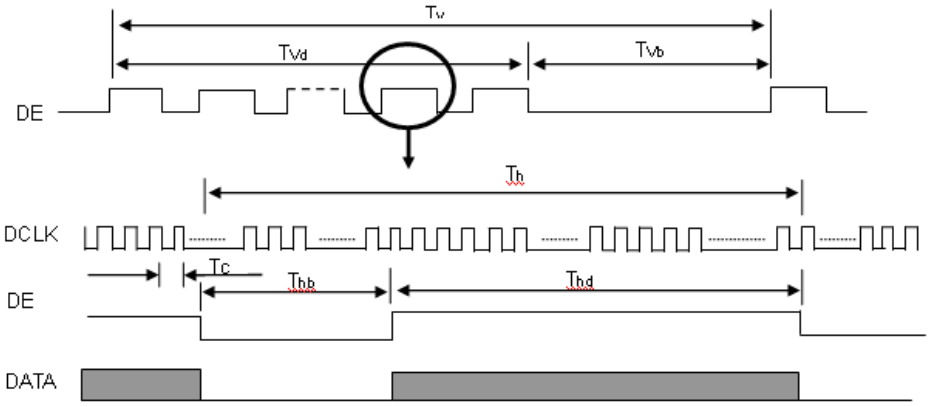
4.5 DISPLAY TIMING SPECIFICATIONS

The input signal timing specifications are shown as the following table and timing diagram.

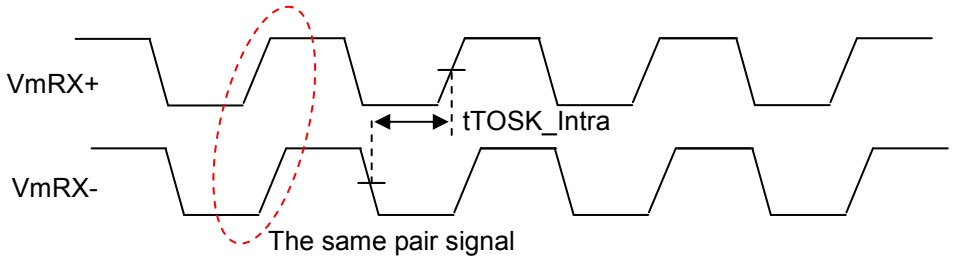
Signal	Item	Symbol	Min.	Typ.	Max.	Unit	Note
V by One	Frequency	Fc	TBD	TBD	TBD	MHz	-
	Period	Tc	TBD	TBD	TBD	ns	
	Intra-Pair skew		-0.3	-	0.3	ns	(1)
	Inter-Pair skew		-5	-	5	ps	(2)
	Spread spectrum modulation range	Fclkin_mod	F_{clkin}-0.5%	-	F_{clkin}+0.5%	MHz	(3)
	Spread spectrum modulation frequency	F_{SSM}	-	-	30	KHz	
Vertical Display Term	Frame Rate	Fr	57.5	60	62.5	Hz	Tv=Tvd+Tvb
	Total	Tv	TBD	2250	TBD	Th	-
	Active Display	Tvd	2160	2160	2160	Th	-
	Blank	Tvb	TBD	90	TBD	Th	-
Horizontal Display Term	Total	Th	TBD	550	TBD	Tc	Th=Thd+Thb
	Active Display	Thd	480	480	480	Tc	-
	Blank	Thb	TBD	70	TBD	Tc	-

Note: Because this module is operated by DE only mode, Hsync and Vsync input signals are ignored.

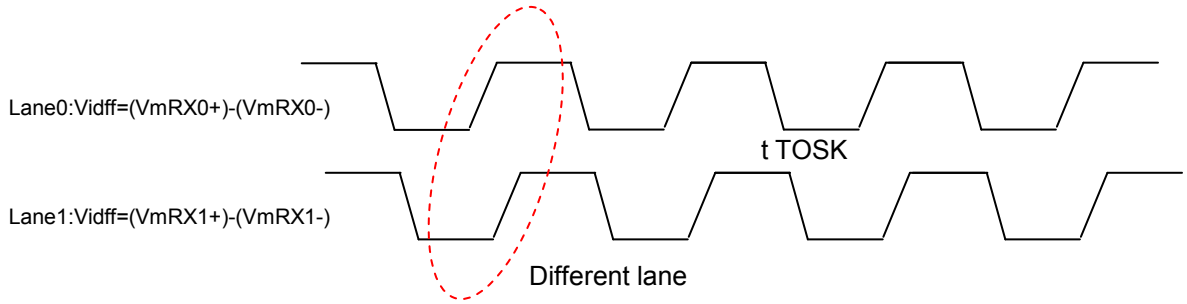
INPUT SIGNAL TIMING DIAGRAM



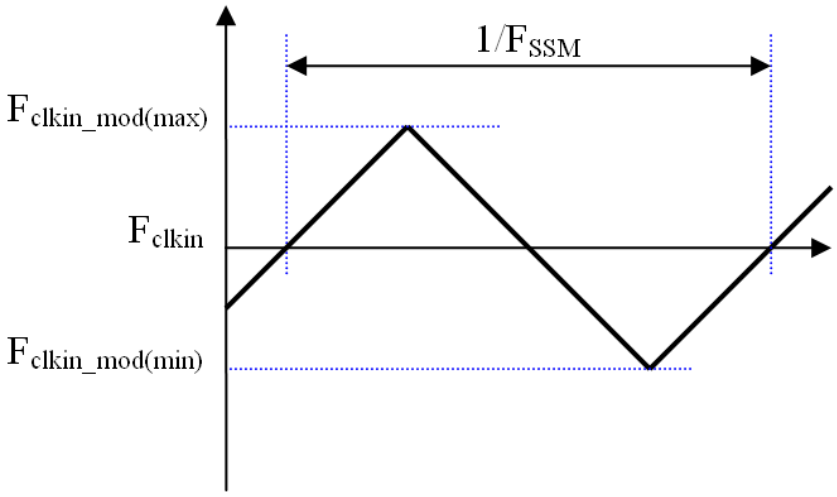
Note (1) V-by-One HS Intra-pair skew



Note (2) V-by-One HS Inter-pair skew



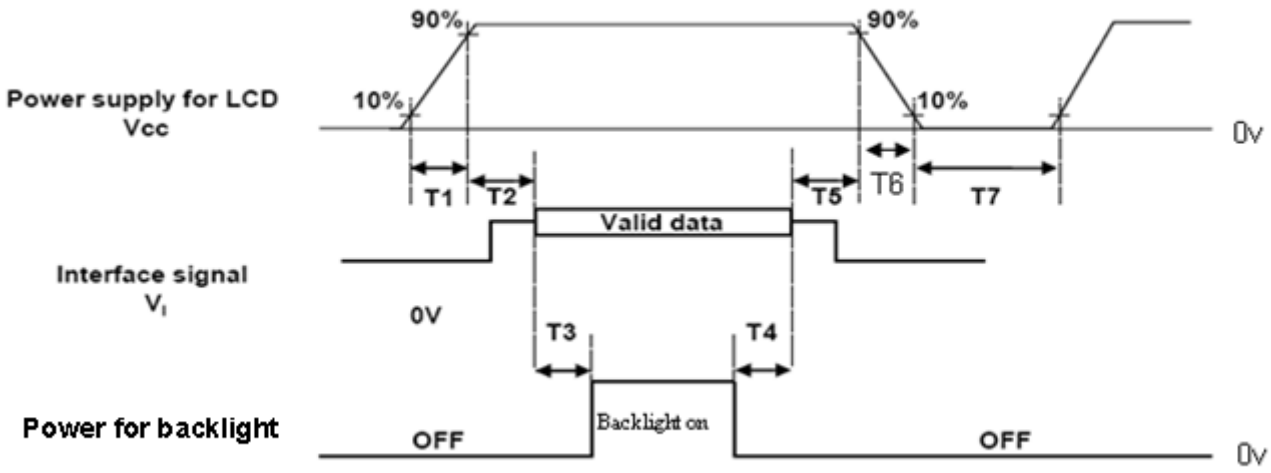
Note (3) The SSCG (Spread spectrum clock generator) is defined as below figures.



Note (4) The DCLK range at last line of V-blank should be set in 0 to Hdisplay/2

4.6 POWER ON/OFF SEQUENCE

The power sequence specifications are shown as the following table and diagram.



Timing Specifications:

Parameters	Values			Units
	Min	Typ.	Max	
T1	0.5	-	10	ms
T2	0	(30)	50	ms
T3	TBD	TBD	-	ms
T4	TBD	TBD	-	ms
T5	0	(20)	50	ms
T6	TBD	-	TBD	ms
T7	TBD	-	-	ms

Note (1) The supply voltage of the external system for the module input should be the same as the definition of Vcc.

Note (2) When the backlight turns on before the LCD operation of the LCD turns off, the display may momentarily become abnormal screen.

Note (3) In case of VCC = off level, please keep the level of input signals on the low or keep a high impedance.

Note (4) T7should be measured after the module has been fully discharged between power off and on period.

Note (5) Interface signal shall not be kept at high impedance when the power is on.

Note (6) INX won’ t take any responsibility for the products which are damaged by the customers not following the Power Sequence.

Note (7) There might be slight electronic noise when LCD is turned off (even backlight unit is also off). To avoid this symptom, we suggest "Vcc falling timing" to follow "t6 spec".

5. OPTICAL CHARACTERISTICS

5.1 TEST CONDITIONS

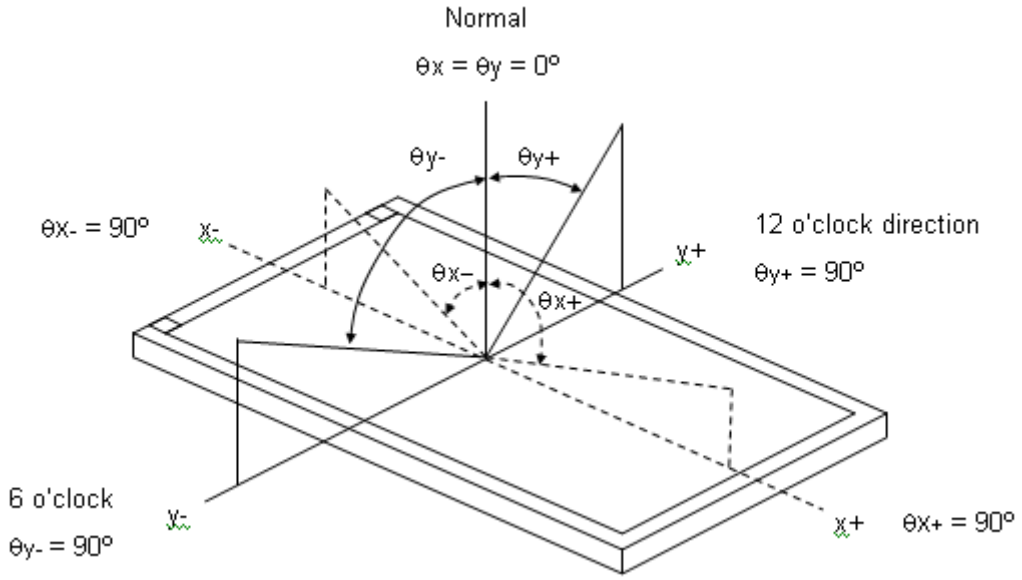
Item	Symbol	Value	Unit
Ambient Temperature	Ta	25±2	oC
Ambient Humidity	Ha	50±10	%RH
Supply Voltage	VCC	5	V
Input Signal	According to typical value in "3. ELECTRICAL CHARACTERISTICS"		
LED Light Bar Input Current Per Input Pin	IPIN	(150±2.55)	mA
PWM Duty Ratio	D	100	%
LED Light Bar Test Converter	(INX 27 - D089583)		

5.2 OPTICAL SPECIFICATIONS

The relative measurement methods of optical characteristics are shown in 5.2. The following items should be measured under the test conditions described in 5.1 and stable environment shown in Note (5).

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Color Chromaticity (CIE 1931)	Red	Rx	θ_x=0°, θ_Y =0° CS-2000 R=G=B=255 Gray scale	Typ – 0.03	(0.630)	Typ + 0.03	-	(1), (5)
		Ry			(0.341)			
	Green	Gx			(0.310)			
		Gy			(0.626)			
	Blue	Bx			(0.156)			
		By			(0.061)			
	White	Wx			0.313			
		Wy			0.329			
Center Luminance of White (Center of Screen)		L_C		250	300	-	cd/m^2	(4), (5)
Contrast Ratio		CR		(700)	(1000)	-	-	(2), (5)
Response Time		T_R	θ_x=0°, θ_Y =0°	-	(1.5)	(2.5)	ms	(3)
		T_F		-	(3.5)	(5.5)		
White Variation		δW	θ_x=0°, θ_Y =0° USB2000	-	-	(1.42)	-	(5), (6)
Viewing Angle	Horizontal	θx +	CR ≧ 10 USB2000	(80)	(85)	-	Deg.	(1), (5)
		θx -		(80)	(85)	-		
Viewing Angle	Vertical	θy +		(70)	(80)	---		
		θy -		(70)	(80)	---		

Note (1) Definition of Viewing Angle (θx, θy):



Note (2) Definition of Contrast Ratio (CR):

The contrast ratio can be calculated by the following expression.

Contrast Ratio (CR) = L255 / L0

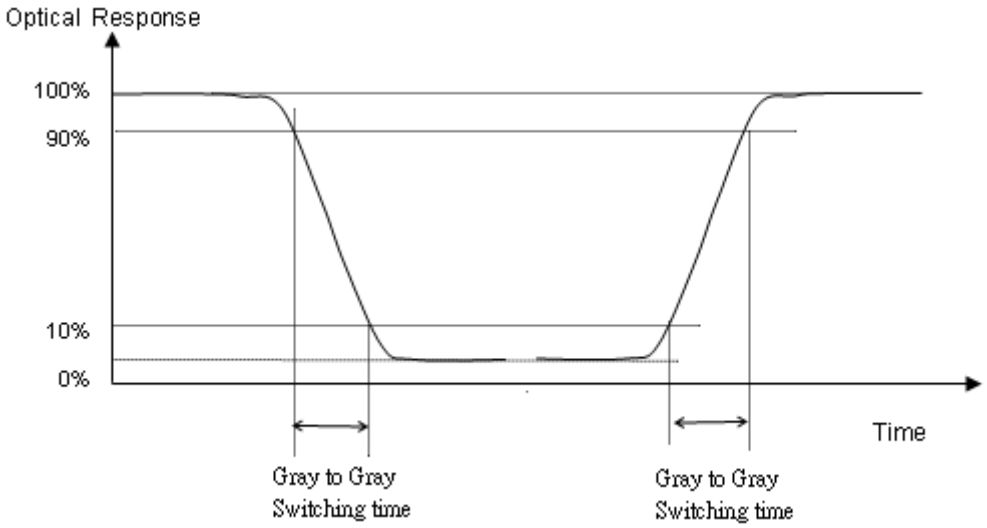
L255: Luminance of gray level 255

L 0: Luminance of gray level 0

CR = CR (5)

CR (X) is corresponding to the Contrast Ratio of the point X at Figure in Note (6).

Note (3) Definition of Gray-to-Gray Switching time：



The driving signal means the signal of gray level 0,31,63,95,127,159,191,223 and 255.

Gray to gray average time means the average switching time of gray level 0,31,63,95,127, 159,191,223 and 255 to each other.

Note (4) Definition of Luminance of White (L_C):

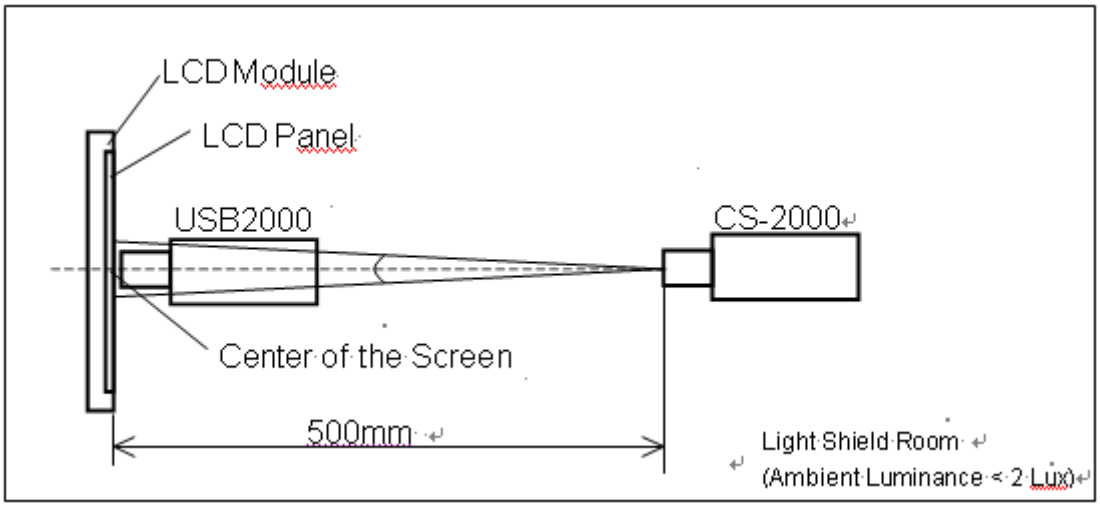
Measure the luminance of gray level 255 at center point

L_C = L (5)

L (x) is corresponding to the luminance of the point X at Figure in Note (6).

Note (5) Measurement Setup:

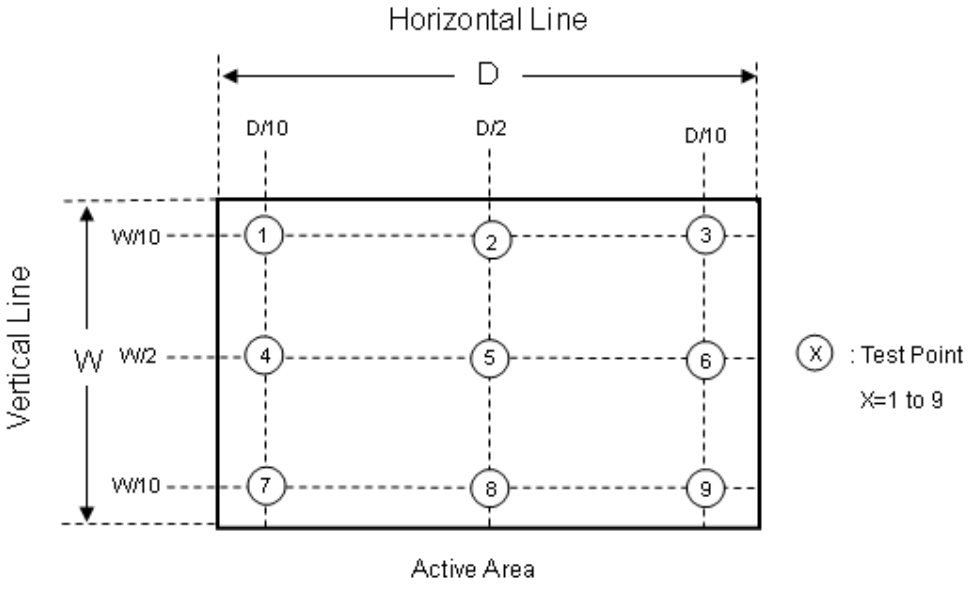
The LCD module should be stabilized at given temperature for 40 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting Backlight for 40 minutes in a windless room.



Note (6) Definition of White Variation (δW):

Measure the luminance of gray level 255 at 9 points

δW = Minimum [L (1) ~ L (9)] / Maximum [L (1) ~ L (9)]



6. RELIABILITY TEST ITEM

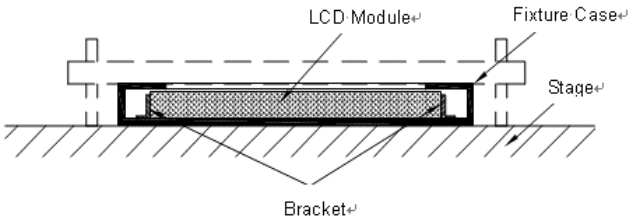
Items	Required Condition	Note
Temperature Humidity Bias (THB)	Ta= 50℃ , 80%RH, 240hours	
High Temperature Operation (HTO)	Ta= 50℃ , 240hours	
Low Temperature Operation (LTO)	Ta= 0℃ , 240hours	
High Temperature Storage (HTS)	Ta= 60℃ , 240hours	
Low Temperature Storage (LTS)	Ta= -20℃ , 240hours	
Vibration Test (Non-operation)	Acceleration: 1.5 Grms Wave: Half-sine Frequency: 10 - 300 Hz Sweep: 30 Minutes each Axis (X, Y, Z)	
Shock Test (Non-operation)	Acceleration: 50 G Wave: Half-sine Active Time: 11 ms Direction : ± X, ± Y, ± Z.(one time for each Axis)	
Thermal Shock Test (TST)	-20℃/30min , 60℃ / 30min , 100 cycles	
On/Off Test	25℃ ,On/10sec , Off /10sec , 30,000 cycles	
ESD (Electro Static Discharge)	Contact Discharge: ± 8KV, 150pF(330Ω)	
	Air Discharge: ± 15KV, 150pF(330Ω)	
Altitude Test	Operation:10,000 ft / 24hours Non-Operation:30,000 ft / 24hours	

Note (1) criteria : Normal display image with no obvious non-uniformity and no line defect.

Note (2) Evaluation should be tested after storage at room temperature for more than two hour

Note (3) At testing Vibration and Shock, the fixture in holding the module has to be hard and rigid enough so that the module would not be twisted or bent by the fixture.

The fixing condition is shown as below:



7. PACKING

7.1 PACKING SPECIFICATIONS

(1) 9 LCD modules / 1 Box

(2) Box dimensions: 713(L) X 429(W) X 453(H) mm

(3) Weight: approximately: (34) Kg (9 modules per box)

7.2 PACKING METHOD

(1) Carton Packing should have no failure in the following reliability test items.

Test Item	Test Conditions	Note
Vibration	ISTA STANDARD Random, Frequency Range: 1 – 200 Hz Top & Bottom: 30 minutes (+Z), 10 min (-Z), Right & Left: 10 minutes (X) Back & Forth 10 minutes (Y)	Non Operation
Dropping Test	1 Angle, 3 Edge, 6 Face, ISTA 31cm	Non Operation

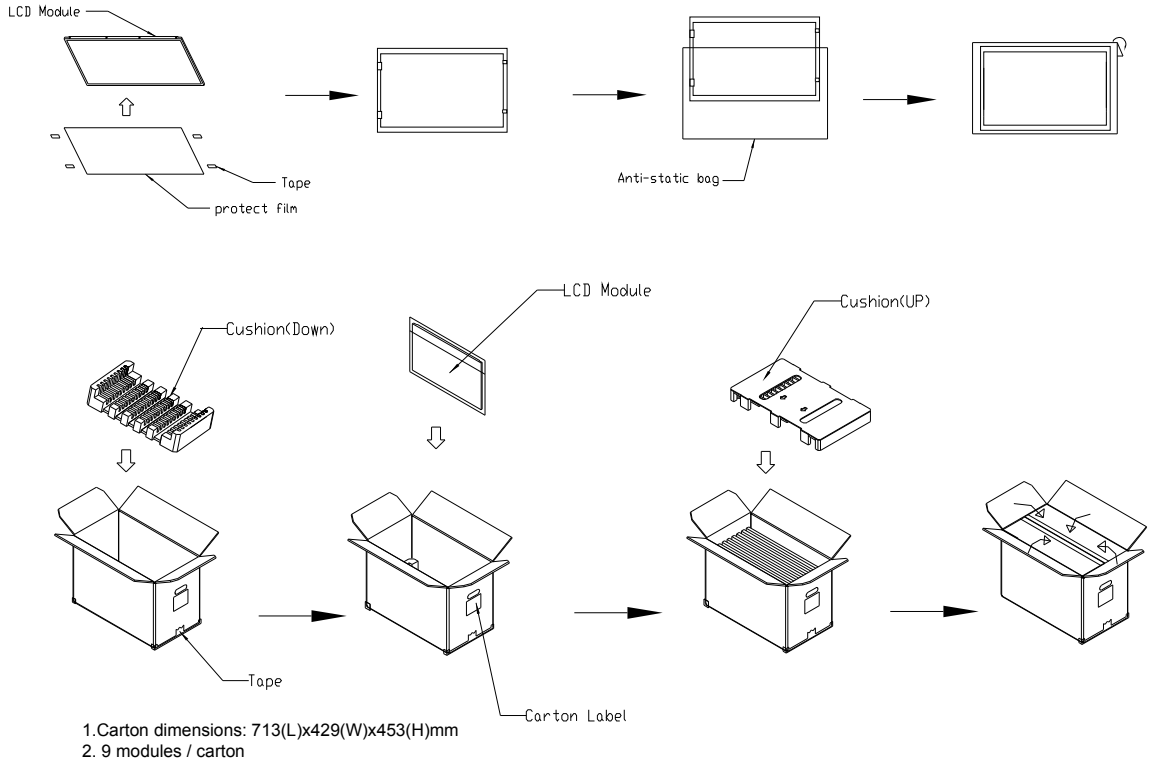
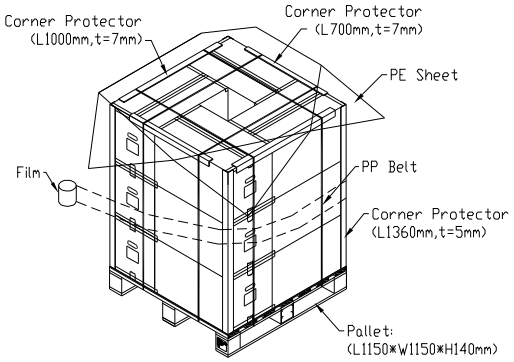


Figure. 7-1 Packing method

7.3 PALLET

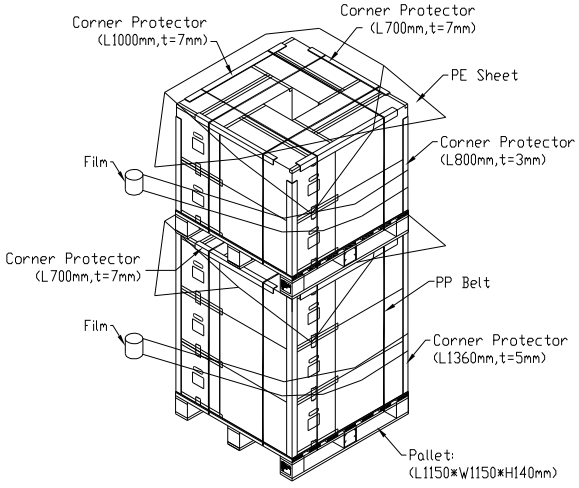
For ocean shipping

Air Transportation



For air transport

Sea / Land Transportation
(40ft HQ Container)



Sea / Land Transportation
(40ft Container)

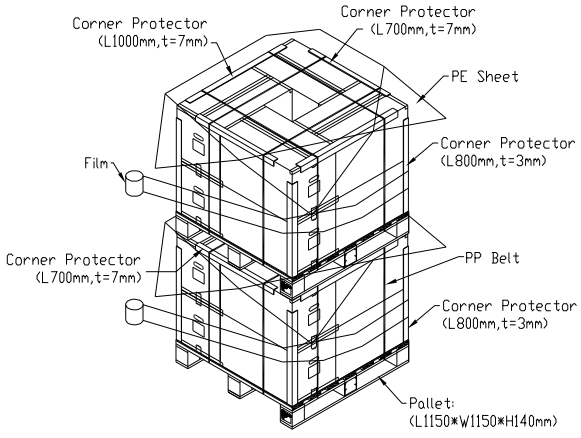
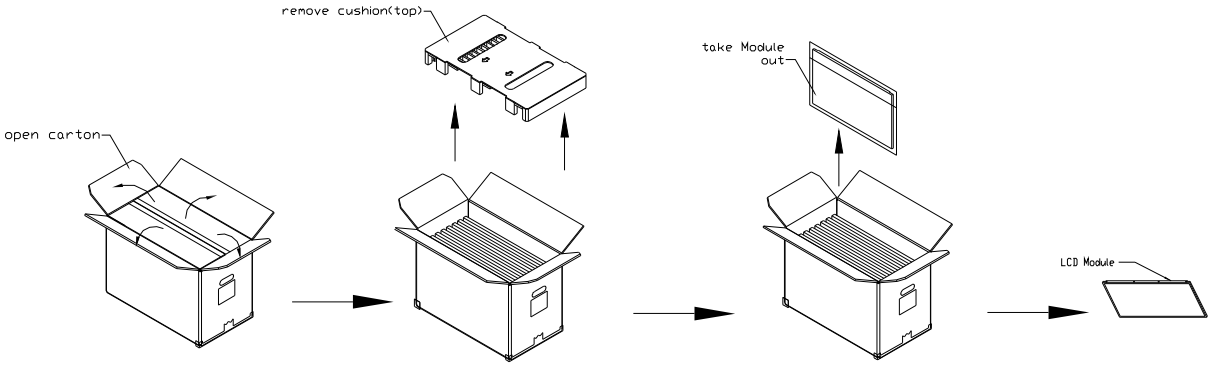


Figure. 7-2 Packing method

7.4 UN-PACKING METHOD



8. INX MODULE LABEL

The barcode nameplate is pasted on each module as illustration, and its definitions are as following explanation.

(a) Model Name: M280DGJ-L30

(b) Revision: Rev. XX, for example: A0, A1… B1, B2… or C1, C2…etc.

(c) InnoLux barcode definition:

Serial ID: XX-XX-X-XX-YMD-L-NNNN

Code	Meaning	Description
XX	InnoLux internal use	-
XX	Revision	Cover all the change
X	InnoLux internal use	-
XX	InnoLux internal use	-
YMD	Year, month, day	Year: 0~9, 2001=1, 2002=2, 2003=3…2010=0, 2011=1, 2012=2… Month: 1~12=1, 2, 3, ~, 9, A, B, C Day: 1~31=1, 2, 3, ~, 9, A, B, C, ~, W, X, Y, exclude I, O, and U.
L	Product line #	Line 1=1, Line 2=2, Line 3=3, …
NNNN	Serial number	Manufacturing sequence of product

(d) Customer's barcode definition:

Serial ID: CM-S0J30-X-X-X-XX-L-XX-L-YMD-NNNN

Code	Meaning	Description
CM	Supplier code	INX=CM
S0J30	Model number	M280DGJ-L30= S0J30
X	Revision code	Non ZBD: 1,2,~,8,9 / ZBD: A~Z
X	Source driver IC code	Century=1, CLL=2, Demos=3, Epson=4, Fujitsu=5, Himax=6, Hitachi=7, Hynix=8, LDI=9, Matsushita=A, NEC=B, Novatec=C, OKI=D, Philips=E, Renasas=F, Samsung=G, Sanyo=H, Sharp=I, TI=J, Topro=K, Toshiba=L, Windbond=M, ILITEK=Q, Fiti=Y, None IC =Z
X	Gate driver IC code	
XX	Cell location	Tainan Taiwan=TN, Ningbo China=CN, Hsinchu Taiwan=SC
L	Cell line #	1,2,~,9,A,B,~,Y,Z
XX	Module location	Tainan, Taiwan=TN ; Ningbo China=NP, Shenzhen China=SH
L	Module line #	1,2,~,9,A,B,~,Y,Z
YMD	Year, month, day	Year: 0~9, 2001=1, 2002=2, 2003=3…2010=0, 2011=1, 2012=2… Month: 1~12=1, 2, 3, ~, 9, A, B, C Day: 1~31=1, 2, 3, ~, 9, A, B, C, ~, T, U, V
NNNN	Serial number	By LCD supplier

(e) FAB ID(UL Factory ID):

Region	Factory ID
TWINX	GEMN
NBCMI	LEOO
NBCMI	VIRO
NBCME	CANO
NHCMI	CAPG

9. PRECAUTIONS

9.1 ASSEMBLY AND HANDLING PRECAUTIONS

(1) Do not apply rough force such as bending or twisting to the module during assembly.

(2) To assemble or install module into user's system can be only in clean working areas. The dust and oil may cause electrical short or worsen the polarizer.

(3) It's not permitted to have pressure or impulse on the module because the LCD panel and Backlight will be damaged.

(4) Always follow the correct power sequence when LCD module is connecting and operating. This can prevent damage to the CMOS LSI chips during latch-up.

(5) Do not pull the I/F connector in or out while the module is operating.

(6) Do not disassemble the module.

(7) Use a soft dry cloth without chemicals for cleaning, because the surface of polarizer is very soft and easily scratched.

(8) It is dangerous that moisture come into or contacted the LCD module, because moisture may damage LCD module when it is operating.

(9) High temperature or humidity may reduce the performance of module. Please store LCD module within the specified storage conditions.

(10)When ambient temperature is lower than 10ºC may reduce the display quality. For example, the response time will become slowly.

9.2 STORAGE PRECAUTIONS

(1) Do not leave the module in high temperature, and high humidity for a long time. It is highly recommended to store the module with temperature from 0℃ to 35℃ and relative humidity of less than 70%

(2) Do not store the TFT – LCD module in direct sunlight

(3) The module should be stored in dark place. It is prohibited to apply sunlight or fluorescent light in storing

9.3 OPERATION PRECAUTIONS

(1) The LCD product should be operated under normal condition.

Normal condition is defined as below :

Temperature : 20±15℃

Humidity: 65±20%

Display pattern : continually changing pattern(Not stationary)

(2) If the product will be used in extreme conditions such as high temperature,high humidity,high altitude ,display pattern or operation time etc…It is strongly recommended to contact INX for application engineering advice . Otherwise , Its reliability and function may not be guaranteed.

9.4 SAFETY PRECAUTIONS

(1) If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth. In case of contact with hands, skin or clothes, it has to be washed away thoroughly with soap.

(2) After the module's end of life, it is not harmful in case of normal operation and storage.

9.5 SAFETY STANDARDS

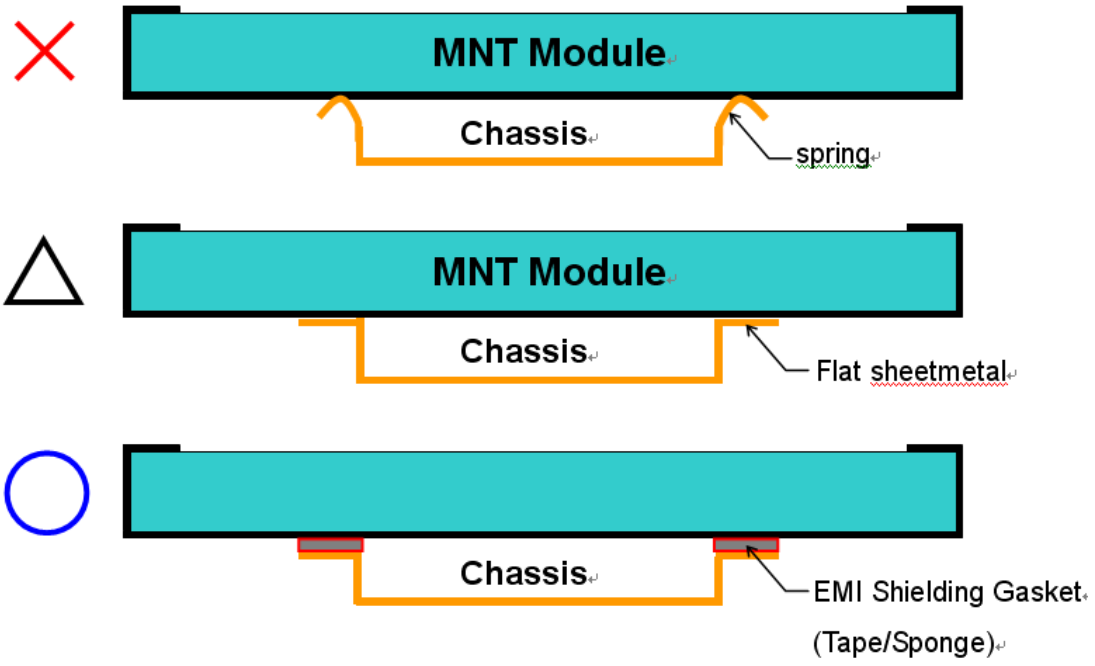
The LCD module should be certified with safety regulations as follows:

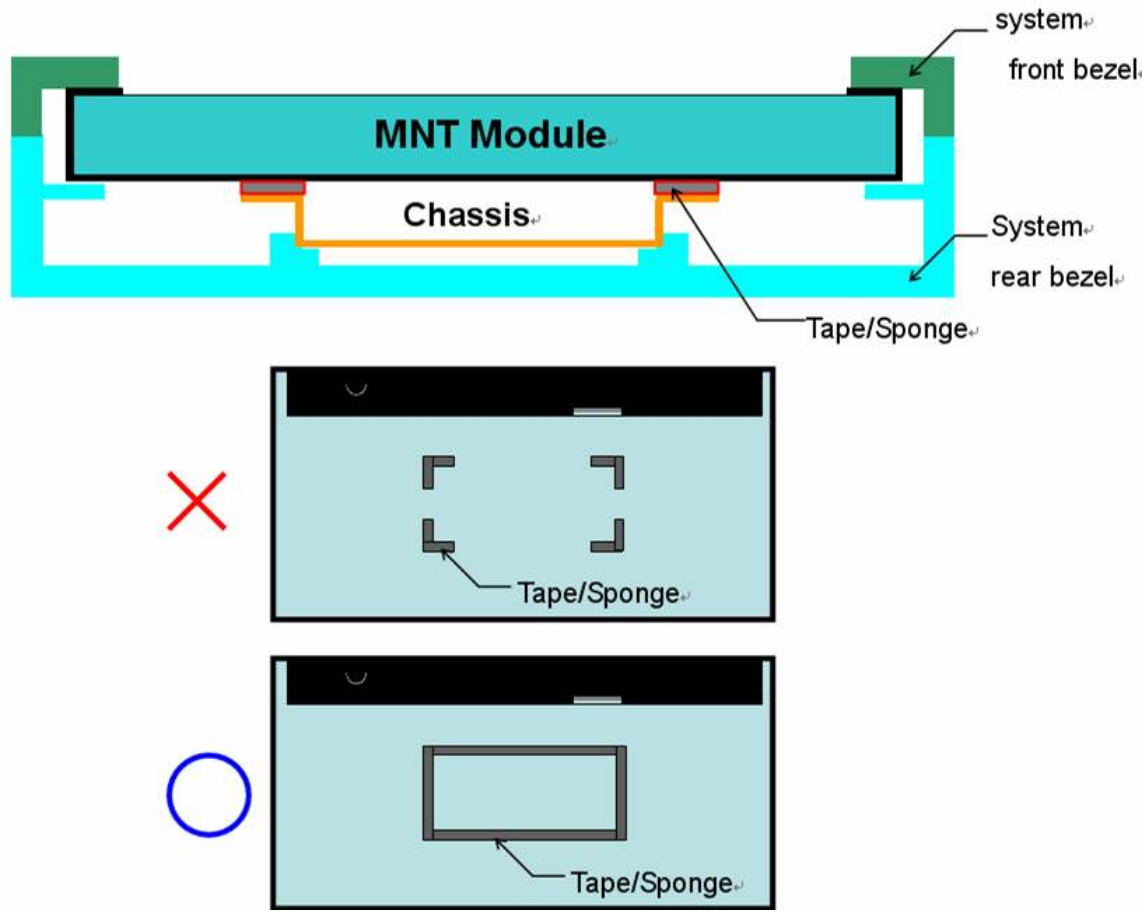
Requirement	Standard	remark
UL	UL60950-1:2006 or Ed.2:2007	
cUL/CSA	CAN/CSA C22.2 No.60950-1-03 or 60950-1-07	
CB	IEC60950-1:2005 / EN60950-1:2006+ A11:2009	

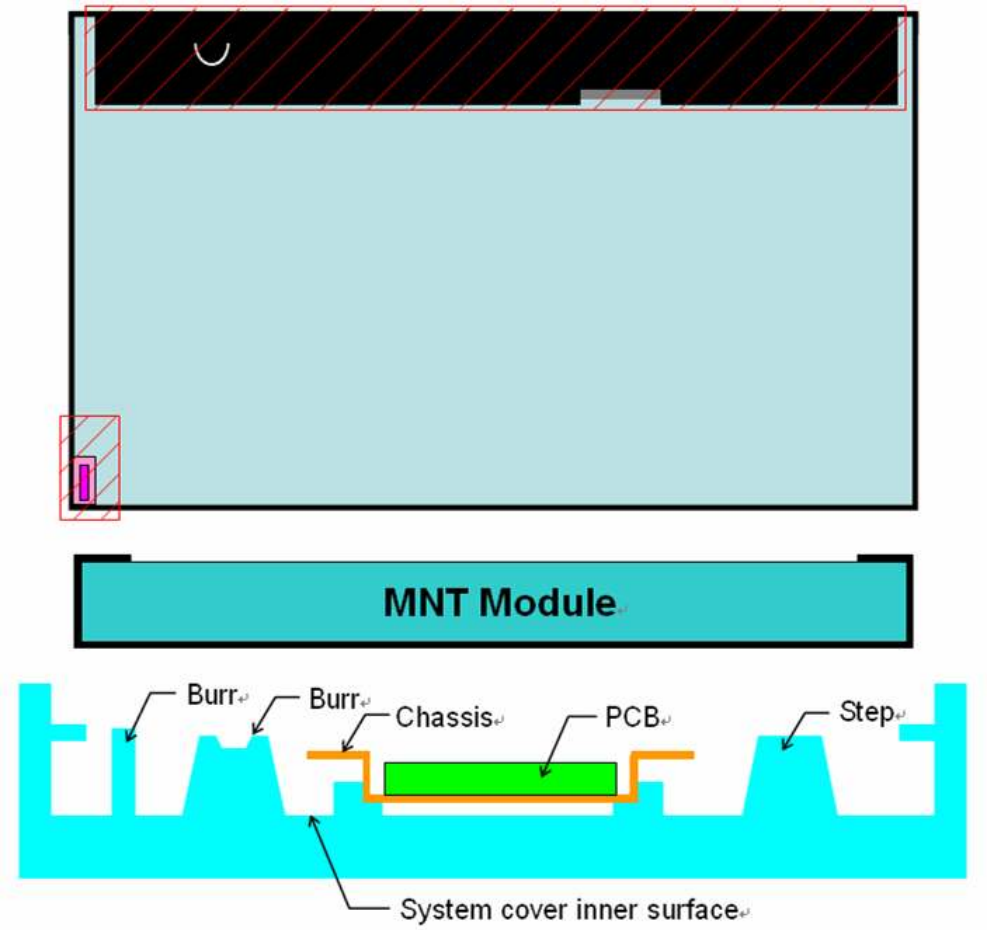
9.6 OTHER

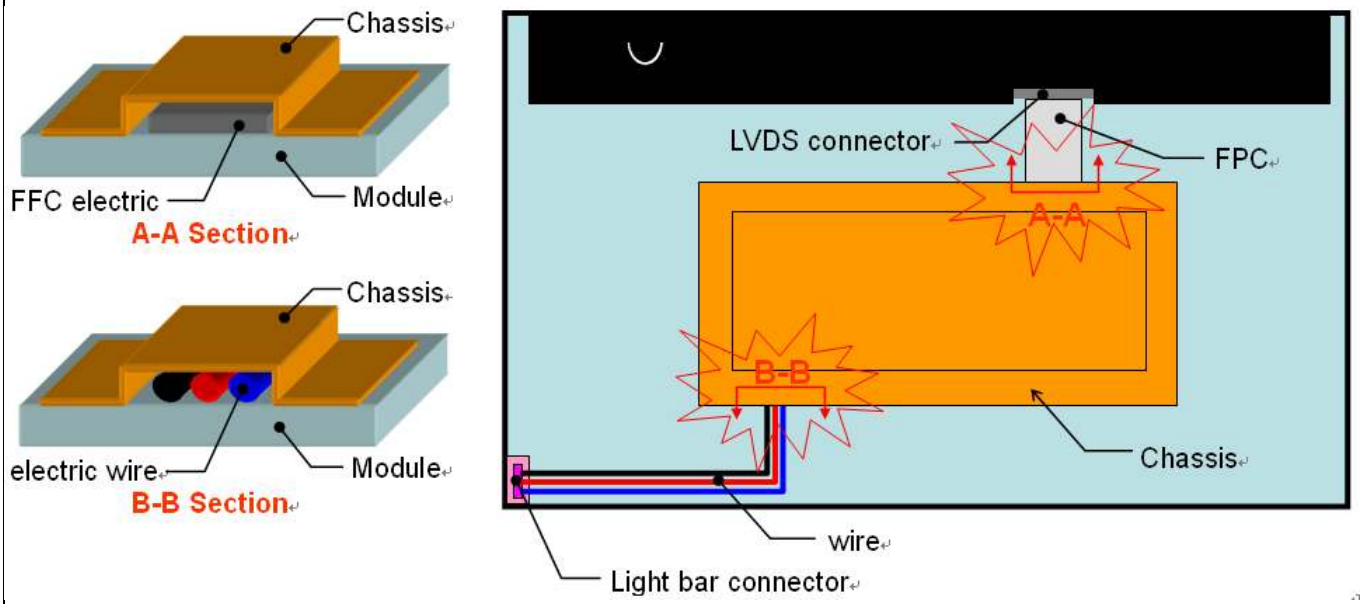
When fixed patterns are displayed for a long time, remnant image is likely to occur.

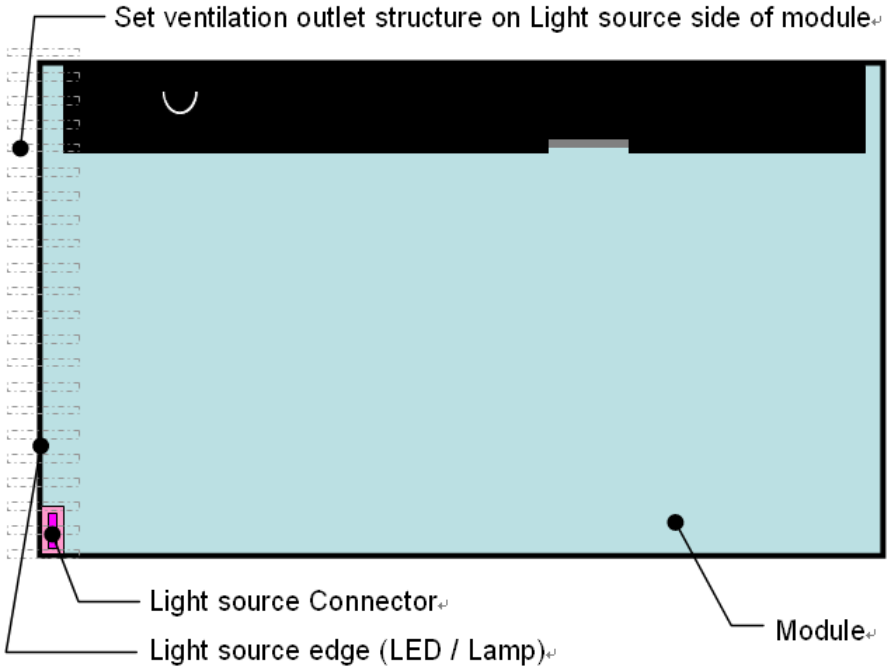
Appendix 1. SYSTEM COVER DESIGN NOTICE

1.	Set Chassis and MNT Module touching Mode
	
Definition	a) To prevent from abnormal display & white spot after Mechanical test, it is not recommended to used spring type chassis. b) We suggest the contact mode between Chassis and Module rear cover is Tape/Sponge, sencond is Flat sheetmetal type chassis (Don't interference from flat sheetmeter of chassis to rear cover of Module).

2	Tape/sponge design on system inner surface
	
Definition	a) To prevent from abnormal display & white spot after Mechanical test, We suggest using Tape/Sponge as medium between chassis and Module rear cover could reduce the occurrence of white spot. b) When using the Tape/Sponge, suggest it be lay over between set chassis and module rear cover. it is not recommended to add tape/sponge in separate location. Since each tape/sponge may act as pressure concentration location.

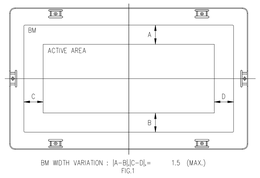
3	System inner surface examination
	
Definition	a). Burr at logo edge, step, protrusion or PCB board will easily cause white spot. b). Keeping flat surface underneath module is recommended. c). The area ( ) on Module PCBA and Light bar connector should keep at least 1mm gap to any structure with System cover inner surface.

4	The overlapping part on System's Chassis and electric wire needs gap structure.
	
Definition	The overlapping part on System's Chassis and electric wire (FPC、FFC and wire) needs gap structure to avoid display of white spot by pressing overlapping part cause interference.

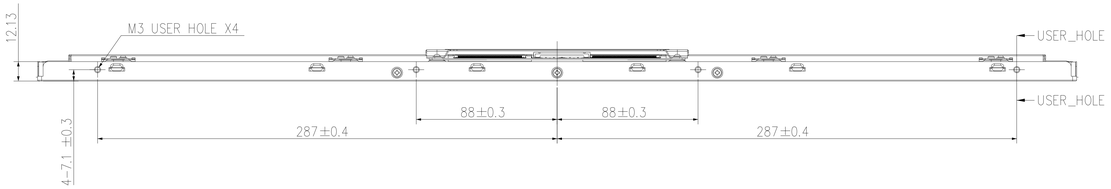
5	System cover's ventilation outlet structure
	
Definition	To prevent from abnormal display of light leakage, We suggest to set ventilation outlet structure on side of Module Light bar in system cover inner surface.

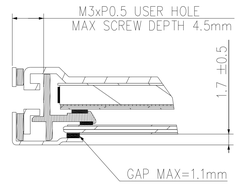
Appendix 2. OUTLINE DRAWING

REV	EC NUMBER	DESCRIPTION	DATE
⚠		First Release	2013/04/03

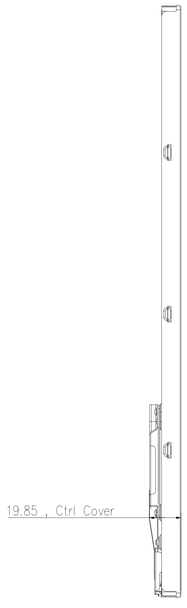


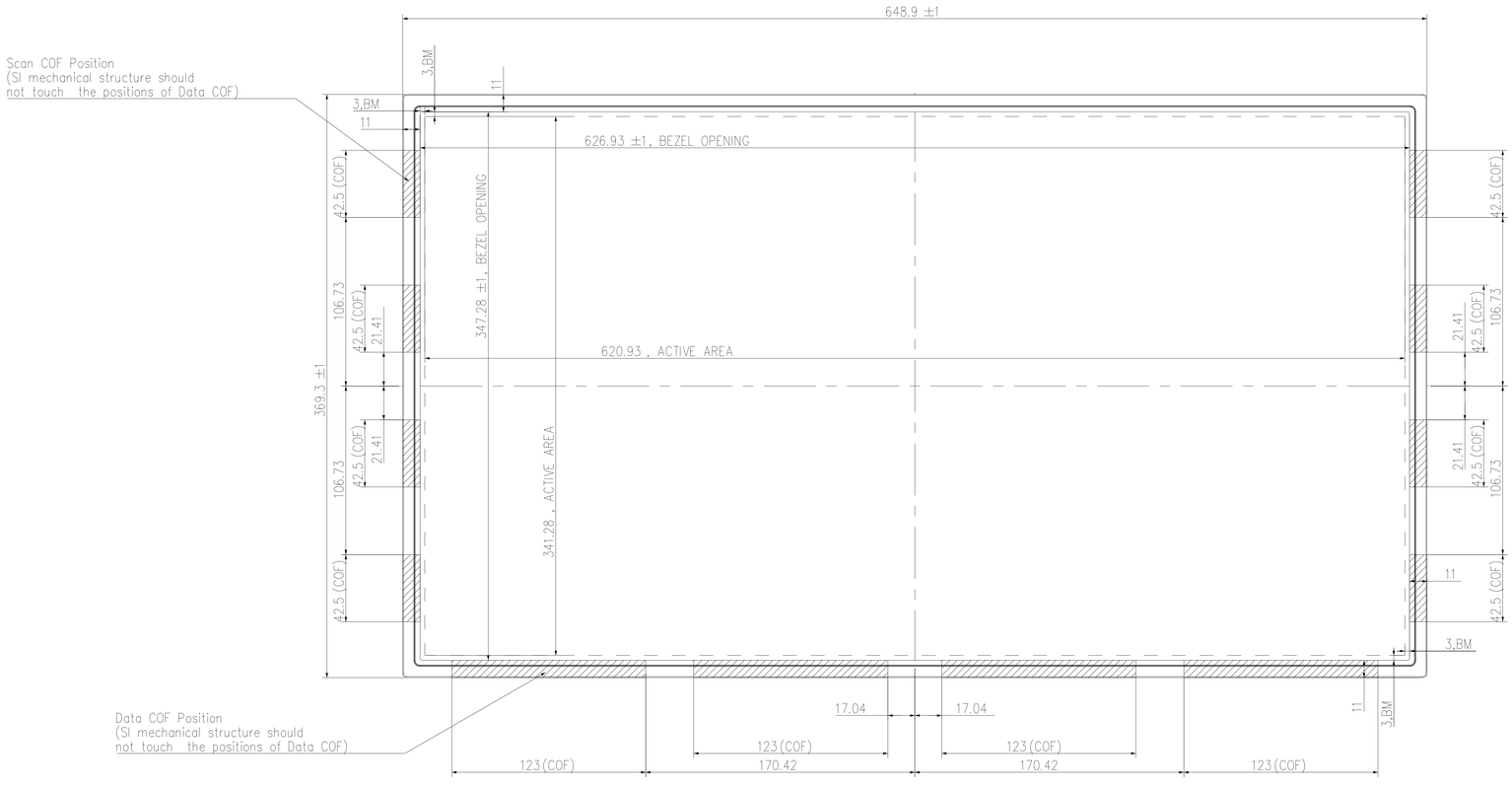
BM WIDTH VARIATION : |A-B|,|C-D|= 1.5 (MAX.)
FIG.1

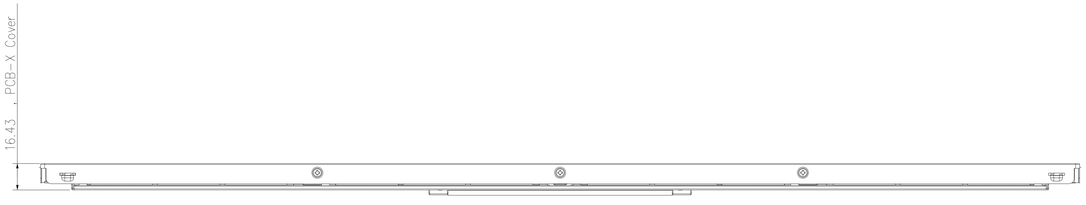


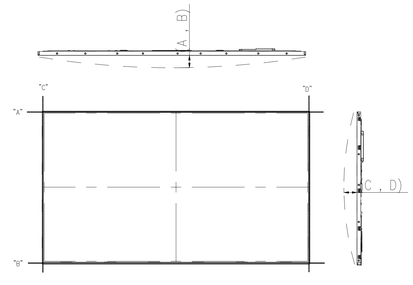


SECTION USER_HOLE-USER_HOLE
SCALE 4:1







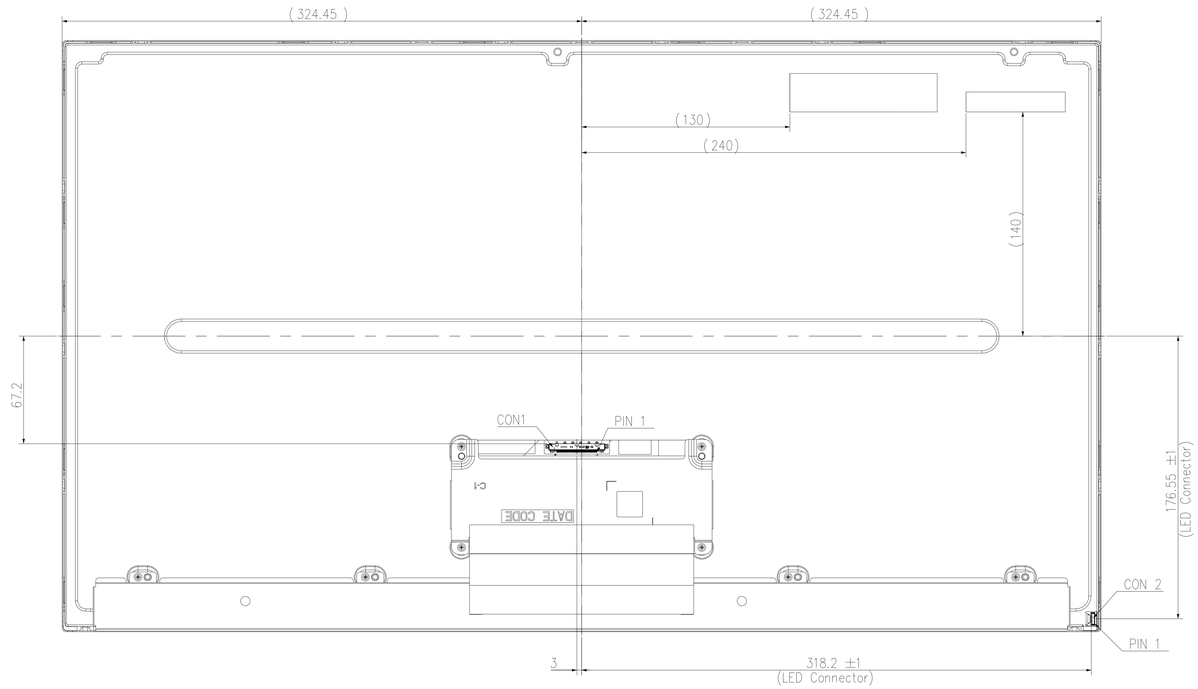


MODULE BENDING TOL. :
| A ,| B | <= 1.9
| C ,| D | <= 1.3

NOTES:
1. UNLESS OTHERWISE SPECIFY TOLERENCE IS ±1.0mm.
2. " ▨ ": SUGGESTED MOUNTING AREA POSITION.
3. CONNECTOR TYPE:
   CON_1: FCN WF23-400-513C or P-TWO 187059-51221, OR EQUIVALENT
   CON_2: FCN WM13-406-063N, OR EQUIVALENT
4. SCREW HOLES TYPE:
   M3: 2.459-2.599mm ,PITCH 0.5 / MACHINE, MAX. TORQUE=7 KGF-CM*10 TIMES, MAX.DEPTH=4.5mm

CPK: CPK DIMENSION	CONTROL DIMENSION	DATE: 2013/04/03	SCALE: 1:1	UNIT: mm	
APPROVED	Steven Lin	PART NUMBER or PDM NUMBER: ---			DRAWING REV.: 01
CHECKED	Steven Lin	PART DESCRIPTION: module_M280DGJ-L30			SHEET NUMBER: 1/2
DESIGNED	Jerry Yen	INNOLUX			SIZE: A1+

REV	EC NUMBER	DESCRIPTION	DATE
1		First Release	2013/04/03



NOTES:
1. UNLESS OTHERWISE SPECIFY TOLERENCE IS ±1.0mm.
2. CONNECTOR TYPE:
   CON_1: FCN WF23-400-513C or P-TWO 187059-51221, OR EQUIVALENT
   CON_2: FCN WM13-406-063N, OR EQUIVALENT
3. SCREW HOLES TYPE:
   M3; 2.459-2.599mm ,PITCH 0.5 / MACHINE, MAX. TORQUE=7 KGF-CM*10 TIMES, MAX.DEPTH=4.5mm

DIMENSIONAL TOLERANCE							
RANGE(mm)	0~6	6~30	30~150	150~300	300~600	600~1000	>1000
TOL. ±	±0.1	±0.15	±0.2	±0.25	±0.3	±0.4	±0.5

CPK DIMENSION / CONTROL DIMENSION	DATE: 2013/04/03	SCALE: 1:1	UNIT: mm
APPROVED	Steven Lin	PART NUMBER or PDM NUMBER: ---	DRAWING REV.: 01
CHECKED	Steven Lin	PART DESCRIPTION: module_M280DGJ-L30	SHEET NUMBER: 2/2
DESIGNED	Jerry Yen	INNOLUX	SIZE: A1+